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ABSTRACT

This paper contrasts three theoretical positions which lead to different predictions about the impact on instruction and learning of enhanced teacher roles in school and classroom decision making. The "teacher professionalism" view maintains that empowerment enhances instruction and learning, the "bureaucratic centralization" approach argues that empowerment impedes effective teaching and learning, and the "loose coupling" perspective suggests that empowerment is largely irrelevant for what happens in classrooms. The assumptions that underlie these perspectives and the conditions under which one or another may be more plausible are discussed. A review of research finds little evidence to support or disprove the claims of any of the three views. Seventh and eighth grade teachers' perceptions of empowerment are then related to the achievement of their students in math and science. Results, which were inconsistent across grade levels and subjects taught, indicated that teacher control over curricular content may be detrimental to achievement, but control over teaching methods may be beneficial. Participation in administrative decision making also yielded inconsistent results, while teacher influence over school policies yielded no effects. The study concludes that the effects of empowerment depend on which aspect of teaching is empowered and the domain in which empowerment occurs. An appendix presents data supporting study findings. (Contains 34 references.) (JDD)

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FINAL DELIVERABLE

TEACHER EMPOWERMENT: A POLICY IN SEARCH OF THEORY AND EVIDENCE

Adam Gamoran, Andrew C. Porter, and Tae-Joong Gahng
University of Wisconsin-Madison

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TEACHER EMPOWERMENT:
A POLICY IN SEARCH OF THEORY AND EVIDENCE

ABSTRACT

Although calls for teacher empowerment are increasingly common, prior theory and evidence are ambiguous as to the value of empowerment for successful teaching and learning. Three distinct theoretical views are offered: A "teacher professionalism" view, which maintains that as dedicated professionals, teachers will improve their teaching and increase learning among students when they have control over school and classroom policies; a "bureaucratic centralization" view, which claims that widespread effective instruction requires strong external controls to foster progress towards well-specified goals; and a "loose coupling" view, which states that current discussions of teacher empowerment are largely irrelevant for teaching and learning. Exploratory analyses of survey data from a national sample of junior-high students and their mathematics and science teachers yields mixed results, with a partial tendency towards higher achievement among students whose teachers report control over teaching methods, and lower achievement among students whose teachers report control over curricular content.

TEACHER EMPOWERMENT:
A POLICY IN SEARCH OF THEORY AND EVIDENCE

Teacher empowerment is a key element in many prominent educational reform strategies. Under headings such as professionalism, autonomy, decision-making, or democratization, recent initiatives commonly call for increasing teachers' opportunities to participate in determining school goals and policies and/or to exercise judgments about curriculum content and instructional methods in their classrooms (e.g., Maeroff, 1988; McNeil, 1989; Shanker, 1989; Johnson, 1990; Sykes, 1990; Zeichner, 1991; Glickman, 1993).

Despite its vigor and ubiquity, the argument for increased empowerment of teachers suffers from theoretical and empirical ambiguity. The problem is particularly acute when empowerment is taken as more than an end in itself; for example, when it is seen as a means to improving teaching and learning. In this paper, we contrast three theoretical positions which lead to different predictions about the impact on instruction and learning of enhanced teacher roles in school and classroom decision-making. We discuss the assumptions that underlie these perspectives and the conditions under which one or another may be more plausible. Finally, we provide a limited test of the effects of some aspects of empowerment.

Three Views of Empowerment

Prior research and experience suggest three divergent views about the impact of increased empowerment. We term these the "teacher professionalism" view, the "bureaucratic centralization" view, and the "loose coupling" view. These views differ in their assumptions about the nature of teaching and learning and about schools as organizations. Most centrally for this paper, they vary in their assessments of the

implications of empowerment for teaching and learning. Whereas the professionalism view indicates that increased autonomy leads to better instruction and higher achievement, the bureaucratic centralization approach maintains that strong curricular guidance enhances productive teaching and learning. In contrast to both, the loose coupling perspective suggests that the current discussion of empowerment is irrelevant for classroom events.

In presenting these views, we distinguish between two domains of empowerment (Conley, 1992): the teacher's ability to control what happens in his or her own classroom, particularly the content and methods of instruction; and the teacher's participation in collective decision-making at the school level. In practice, empowerment in these two domains may conflict with one another. For example, in schools reputed to have high levels of empowerment, teachers may have a strong voice in school issues, but having spoken, they may be tightly bound in their classroom practices by the collective decisions (Porter, 1989). The three theoretical views of empowerment differ in their judgments about how school and classroom domains are linked, and about the implications of changes in these domains for teaching and learning.

The Teacher Professionalism View

Proponents of empowerment argue that teachers are in the best position to assess the needs of their students (e.g., Darling-Hammond, 1988). Consequently, allowing teachers greater latitude in decision-making would lead to more effective instruction and higher achievement. According to this perspective, most teachers are well-trained, experienced, and dedicated professionals. They possess essential knowledge about curriculum and instruction. Given the opportunity, they will develop their own strategies for bringing about success in

their classrooms. Advocates of this position state that effective teaching has been hampered by excessive external control, which is not sufficiently sensitive to the exigencies of particular schools and classes (Carnegie Council on Adolescent Development, 1989).

The first assumption of this view is that teachers are motivated professionals. The second is that teaching and learning are processes involving substantial give-and-take between teachers and students. Rather than a one-way transmission of knowledge, the professionalism perspective conceives of instruction as the joint product of teachers' and students' actions. Effective instruction requires attending to students' responses, which may differ from place to place and time to time. Only when teachers have sufficient autonomy to depart from a pre-ordained plan, can they help students to maximize their learning.

Adherents of this view also favor increased teacher participation in school-level decision making. They argue that when teachers have greater say in collective issues, they are more motivated to bring out the best in their students (Maeroff, 1992; Smylie, 1992; see Rowan, 1990, for a review). This claim was clearly articulated by a teacher who commented to White (1992, p.79): "The more input we have on decisions that affect us, the more comfortable we feel with teaching, and the better lessons students receive, and the more they learn."

In this approach, school-level and classroom-level empowerment are not viewed as contradictory. Adherents of this view have not explicated this point fully, but two possibilities are evident. First, collective decisions and individual teacher decisions may address separate and distinct policies and procedures. For example, decisions on school-wide issues such as behavioral codes, curricular organization, and staff development may be made

collectively, while classroom issues such as what and how to teach (within broad guidelines) may be left up to individual teachers. Second, a school's faculty might collectively decide to delegate most decisions to individual teachers. Under both of these scenarios, school- and classroom-level empowerment would not conflict.

The Bureaucratic Centralization View

In its strongest form, the bureaucratic centralization view is skeptical about the training, skills, and goals of teachers. It aims to ensure that teachers follow a pre-specified plan that has demonstrated effectiveness for externally-defined goals (e.g., Callahan, 1962; Gentile, 1988). Increasing teachers' opportunities for decision-making, particularly about classroom matters, creates the danger that teachers will choose subjects and/or methods that are not appropriate or productive for student achievement. Hence, this view maintains that more empowerment results in less effective teaching and lower achievement. To maintain quality, the bureaucratic centralization perspective favors external mandates and standardized practice for teaching.

A softer version of this perspective suggests that there are some areas in which outside experts are better informed than teachers, and that decisions in these areas -- but not in all aspects of teaching -- should be made by administrators or others outside the teaching ranks. For example, some writers argue that whereas teachers know best about what methods work for them, they should not have as much latitude about what content to teach (see Porter, Archbald, and Tyree, 1990).

Another version of the bureaucratic centralization approach accepts the value of teacher participation in collective decision-making as a way of increasing teacher

commitment and effort, but demands conformity at the classroom level once collective decisions are reached (Porter, 1989). For example, this view might support teacher participation in curriculum design, but require all teachers to follow the curriculum once it is set. In this variant, quality is maintained through collective professional responsibility (Conley, Schmidle, and Shedd, 1988; Bimber, 1993). Even when teachers' commitment to their work is activated through collegial planning, however, bureaucratic mechanisms ensure that collective decisions are enforced.

Both of the modified views indicate that empowerment in some areas may have beneficial consequences, but in other areas, tight controls are required to uphold quality. Outside the strictest version of this perspective, adherents generally recognize that the effects of empowerment may vary depending on the context in which it occurs.

Assumptions about teachers and teaching in the strictest version of the bureaucratic centralization view could hardly be more different than those of the professionalism perspective. Whereas the latter emphasized teachers' unique knowledge and judgment, the former stresses individual teachers' lack of secure grounding in educational and content principles. However, the two views share an assumption about schools as organizations: Both presume that decisions taken centrally have substantial impact on what teachers can do in their classrooms. In this assumption they differ sharply from the third view.

The Loose Coupling Perspective

In recent years, many writers about schools as organizations have rejected the notion that schools are bureaucracies operating through rules, directives, supervision, and other usual trappings of authority (e.g., Weick, 1976; Meyer and Rowan, 1978; Tyler, 1985;

Gamoran and Dreeben, 1986). Instead, these writers claim that formal authority is not a major mechanism of coordination in schools. Because of conflicting goals and an uncertain technology (i.e. the relation between teaching and learning is not well understood), schools tend to seal off classrooms from outside inspection. Strict control is maintained over certain ritual aspects of schools, such as which students and teachers are assigned to each class. But what happens after assignment to classes occurs is not examined.

This view claims that schools are "loosely coupled," meaning that decisions occurring in one part of the school do not reverberate in clearly patterned ways elsewhere in the school. Thus, changes in teacher participation in school-level decisions would have little impact on classroom practice. Further, teachers already have a high degree of autonomy about what occurs in their classrooms, so increased empowerment at the classroom level would be irrelevant to teaching and learning.

One modification to this view suggests that although teachers are autonomous with regard to teaching methods, they are constrained in the content they teach by materials allocated and standards determined by the school and district administration (Gamoran and Dreeben, 1986; Archbald and Porter, 1994). This modified view fails to indicate whether increased autonomy over content would be beneficial or detrimental for effective teaching and successful learning. It suggests, however, that if either of the previous two perspectives (professionalism or centralization) has any validity, it is more likely to be in the area of content than pedagogy.

Some Contingencies

None of the three views says much about conditions under which the predicted effects (or lack of effects) of empowerment are more or less likely to occur. Yet the validity of each is likely to depend, at least in part, on the surrounding circumstances and on the extent to which the underlying assumptions hold at a given time and place.

The professionalism view's assumptions about the characteristics of teachers could be modified by acknowledging that teachers vary in their professionalism; hence, those with more expertise, dedication, and skill would be more likely to improve their instruction and raise student achievement when they are given free reign to make decisions. Instead of assuming that teachers are professionals and advocating autonomy on that basis, one can suggest that the impact of empowerment may depend on the presence of resources available to the teacher. These resources may be individual -- such as experience, subject matter expertise, and teaching skill -- or collective, such as collegial relations with fellow teachers and opportunities for staff collaboration. The greater the teacher's access to such resources, the higher the payoff from empowerment.

The notion in the bureaucratic centralization view about the need to maintain quality through standardization may pertain more to some aspects of empowerment than others. If it is possible to mandate what and how to teach -- an assumption of this perspective -- then centralization is more likely to benefit teaching and learning in areas characterized by clear and measurable goals. Hence, empowerment over curricular content is the area most likely to reduce achievement, according to the centralization perspective. When teachers are free

to choose their own content, the curriculum may be poorly aligned with standardized tests, and students may perform less well (Walker and Schaffarzick, 1974).

These contingencies are less salient for the loose coupling perspective, since according to that view teacher autonomy is largely a given. However, the claim that some teachers make better use of their autonomy than others, depending on personal and collective resources, is not inconsistent with the loose coupling view.

Evidence about the Effects of Empowerment

Research on schools provides little evidence to support or disprove the claims of any of the three views. Porter and his colleagues (1988) conducted a series of studies on factors influencing teachers' decisions about what to teach in elementary school mathematics. One study showed that teachers who made less use of textbooks -- who might thus be considered more empowered with regard to curricular content -- placed greater emphasis on drill and practice of computation (Freeman and Porter, 1989). At the same time, teachers who relied more on textbooks devoted more attention to application and understanding of mathematical concepts. These findings seem to contradict the teacher professionalism view, for the less-empowered teachers gave more attention to the type of instruction favored by the empowerment perspective.

In a study of mathematics and social studies in 12 high schools in 6 urban districts in 3 states, Archbald and Porter (1994) found that curriculum control policies were perceived by teachers to have their largest effects on content decisions in mathematics. Regardless of the degree of curriculum control exercised by states and districts, however, teachers in both mathematics and social studies reported high degrees of personal control over both content

and pedagogy. Even when curriculum control policies were perceived to have effects, there was no evidence that teachers felt less efficacious or satisfied with their jobs. These findings suggest that content is more controlled than pedagogy and math is more controlled than social studies, but a high degree of teacher autonomy is the norm.

In a study of four high schools, McNeil (1989) argued that rigid controls over teachers detracted from the quality of teacher-student interaction. These controls included reforms mandated by administrators without teacher input, centralized testing of students, and checklist evaluations of teachers. Teachers responded to such controls with what McNeil termed "defensive teaching": watering down and fragmenting the curriculum, passing over complex issues raised by students, and generally being unresponsive to students' ideas. McNeil's study implies that low levels of empowerment lead to reductions in the quality of instruction, supporting the professionalism view.

These studies address the link between empowerment and instruction, but do not draw the connection to student achievement. If achievement levels reflect the "productivity" of a school, then information on the impact of empowerment on productivity in other types of organizations may be germane. A meta-analysis of research on the relation between workers' participation in decision-making and their productivity concluded that the two are positively related (Miller and Monge, 1986). However, it is not clear whether this form of empowerment led to higher productivity, or whether organizations with more productive workforces allow workers to make more decisions. Moreover, a subsequent review questioned the strength of the positive relation, noting that the correlation between participation and productivity is much smaller when the two conditions are indicated by data

from separate sources, as compared with studies in which both are reported by the same source of information (Wagner and Gooding, 1987). Moreover, performance-based measures of productivity tend to show weaker ties to participation in decision-making than perceptual measures of productivity. Thus, despite a sizeable number of studies, conclusive evidence about the impact of participation in decision-making on productivity is lacking.

Teacher Empowerment and Student Achievement: Empirical Exploration

To explore the implications of teacher empowerment for instruction and learning, we use data from the younger cohort of the Longitudinal Study of American Youth (LSAY), a nation-wide sample of students who were surveyed beginning in seventh grade in 1987, with follow-ups in each of the next two years. Data were also collected from parents, school principals, and students' math and science teachers. With these data, we examine seventh- and eighth-grade teachers' perceptions of empowerment, the relation of these perceptions to the achievement of their students, and the extent to which this relation occurs through variation in selected classroom practices.

Our measures of empowerment are restricted to the four aspects of teachers' perceived influence and control which were available in the data: participation in administrative decision-making; influence on school policies; control over the content of instruction in one's classroom; and control over one's instructional methods. These measures are based on teachers' responses to questionnaires, as described below. Obviously there are other aspects of empowerment which we are not addressing, and there are other ways of measuring empowerment, which we cannot explore in this study.

Sample and Data

The LSAY seventh grade cohort sample was drawn through a two-stage procedure, in which 51 schools were randomly selected within strata defined by geographic criteria, and then about 60 students were randomly selected within each school, for a total of 3,116 students. Students completed tests of math and science achievement in the fall of each year, as well as questionnaires each fall and spring. Also, questionnaires were administered to teachers and one parent was interviewed by telephone each spring. About 300 teachers in each subject were surveyed each year. Because we are using data from the base year (seventh grade) and first two follow-ups (eighth and ninth grades), and because achievement was measured each fall, our analyses concern achievement growth that occurred during grades seven and eight (i.e., from fall of seventh grade to fall of eighth, and from fall of eighth grade to fall of ninth). Miller et al. (1992) provide further details about the sample and measures. Means and standard deviations of variables used in this study appear in Table 1 for seventh and eighth grade math, and in Table 2 for seventh and eighth grade science.

Data from students and parents. LSAY measured student achievement with multiple-choice tests in math and science, using items drawn from the National Assessment of Educational Progress (Miller et al., 1992). Test items were converted into scores using methods from Item Response Theory (IRT), in which items are weighted according to their difficulty, as indicated by student response patterns. The scores were scaled to have means of 50 and standard deviations of 10 in the first year they were taken, i.e. the fall of seventh grade. Students repeated the tests at the beginning of eighth and ninth grades.

A dummy variable for sex (1 = female) was constructed from student questionnaire responses. Information from parents on their educational and occupational levels, and data

from students on household possessions, yielded a composite indicator of student socioeconomic status (SES), scaled in standard deviation units.[1]

Data from teachers and school records. Measures of perceived empowerment were derived from teacher reports. We constructed four indicators from ten questionnaire items. (See the appendix for the wording of questionnaire items and reliabilities of multiple-item constructs.) The empowerment variables are: (1) Participation in administrative decision-making, describing staff involvement in decision-making and consultation between the principal and school staff; (2) Influence on school policy, referring to teachers' roles in determining student behavior codes, grouping policies, school curriculum, and the content of inservice programs; (3) Control over curricular content, as reflected in selecting instructional materials, and selecting the content, topics, and skills to be taught; and (4) Control over teaching methods, as indicated by selecting teaching techniques and determining the quantity of homework. The indicators consist of unweighted means of their components. The components were selected on theoretical grounds, but exploratory factor analyses also supported this clustering of items. Each scale ranged from 1-6 with 6 as high. The means in Tables 1 and 2 reveal extremely high levels of perceived control over teaching methods, with little variability. The other items also average closer to the top than the bottom of the scale, although they are less extreme and more variable. Thus, LSAY teachers reported a high degree of empowerment with regard to teaching methods, and substantial but not complete control over curricular content and school policies. In general, the four empowerment composites are positively correlated; the correlations between perceptions of

school-level empowerment and classroom-level empowerment are mainly zero or slightly positive.

We obtained measures of teachers' academic backgrounds and the track levels of classes, because these variables may be associated with both empowerment and student achievement. Teacher background variables include years of experience, whether the teacher had an advanced degree, and whether the teacher majored in math or math education (for math teachers), and whether the teacher majored in science or science education (for science teachers). These items were drawn from the teacher questionnaire. Classes were coded as high track, middle track, low track, or untracked. Information on tracking came primarily from school curriculum guides, but this was validated by teachers. Hoffer (1992) provides further details about the coding of track levels in LSAY.

We also wished to learn whether the relation between empowerment and achievement (if it exists) is associated with teachers' instructional practices. Effects of empowerment on achievement (whether positive or negative) may operate by allowing teachers to change what occurs in the classroom. Consequently, we selected three measures of instruction, also taken from teacher questionnaires, for inclusion in the study. These variables are: (1) The percentage of time spent teaching new material; (2) The number of hours per week spent in discussion; and (3) The extent of emphasis on problem-solving, measured in a scale of 1 to 4 with 4 as high. (See Tables 1 and 2 for means and standard deviations.) The first item, time on new material, is the sort of behavior with which the bureaucratic centralization perspective is concerned: too much autonomy might allow teachers to reduce their coverage of new material. The second and third items, discussion and problem-solving, are typically

advocated by proponents of the teacher professionalism perspective. However, they are not ruled out by writers holding other views about empowerment; indeed, increased discussion and problem-solving are goals of most contemporary reform efforts. Our aim in including these measures is to examine whether the relation between empowerment and achievement is established through teachers' adjustment of their classroom practices.

Finally, we obtained information on some of the contingencies that might affect the impact of empowerment. In addition to teacher background variables, we constructed composite variables indicating degrees of administrative leadership, staff collaboration, and teacher morale. (The wording of questionnaire items and reliabilities of composite variables are provided in the appendix.)

Methods and Results

Ordinary least squares regression is our primary tool for assessing students' growth in math and science achievement. We examine whether teacher perceptions of empowerment are related to that growth. Then we consider whether classroom instruction is a mechanism through which the impact of empowerment on achievement occurs.

Although over 3,000 students were included in the initial LSAY cohort, the sample has been dramatically reduced for our analyses. There are three reasons for the reduced sample: attrition of students over time; missing data for students at different points in time; and teacher non-response. Because of our interest in the relation between teacher perceptions and behavior on the one hand, and student outcomes on the other, we were most concerned about the loss of cases due to teacher non-response. If the least-empowered teachers were

least likely to respond, for example, our analyses could be distorted. Also, this problem led to a substantial loss of students -- over 500 each year.

To cope with teacher non-response, we created an indicator which helps correct for this problem in the regression analyses. The indicator is a measure of students' propensities to have a teacher who failed to respond to the questionnaire. It is constructed with a regression equation that predicts the likelihood of having a non-responding teacher.[2] By including this variable in the regression analyses, the effects of the other independent variables in the model are purged of a spurious correlation due to students' differential likelihood of having non-responding teachers (Berk, 1983).

Effects of empowerment. Tables 3 - 6 present the regression results. The first column shows the impact of student and teacher background conditions and track level, without considering empowerment. The second column adds the four measures of empowerment. Instructional measures are added in the third column. Each column represents a regression equation, so each coefficient in a column describes the impact of that variable, controlling for all the other variables included in that column.[3]

The second column of Table 3 shows that none of the empowerment variables exerts a significant effect on seventh-to-eighth-grade achievement growth in mathematics. By contrast, three empowerment variables are significant in the same analysis for the following year (see Table 4, column 2). This analysis yields positive effects on achievement for individual teachers' control over their own teaching methods and their participation in administrative decision-making, but negative effects for teacher control over the content of their own teaching. Note that the pattern of positive effects for control over methods and

negative effects for control over content was predicted by a modified version of the bureaucratic centralization view. This pattern also appears in the analysis of seventh-to-eighth-grade science achievement (Table 5, column 2). However, the coefficient for participation in administrative decision-making is negative in this case. Finally, the analysis of science in the following year shows no significant effects for the empowerment variables (Table 6, column 2).

Neither the opposing effects of content and methods empowerment, nor the varied direction of effects of participation in administrative decision making, can be attributed to collinearity among the empowerment composites. When control over content and control over methods are alternately removed from the model, the one remaining does not change sign. In addition, when the empowerment variables are added to the model separately and one at a time instead of as a block, the direction of effects is the same as that reported here, although some coefficients are smaller and non-significant.

The role of instruction. The effects of empowerment we observed do not seem to operate by encouraging changes in teachers' classroom practices, as far as one can tell from the instructional measures included in the third model. The coefficients for empowerment effects do not decline from the second to the third columns of Tables 3 - 6, indicating that variation in these instructional conditions does not account for the observed relations between empowerment and achievement. A possible exception is the negative effects of control over content on mathematics achievement from eighth to ninth grade (Table 4): the coefficient declines from -.46 in column 2 to -.37 in column 3, suggesting that the negative impact may have been due in part to lower levels of beneficial instructional conditions in classes with

teachers who control their own content. This interpretation, however, is greatly weakened by the lack of significant effects of any of the instructional variables. Indeed, among all four analyses, only the effects of covering new material on seventh-to-eighth-grade math achievement yields significant effects in the expected direction.

Effects of contingencies. Following these analyses, we also looked at the effects of interactions of the four empowerment variables with the teacher background variables, and with composite indicators of administrative leadership, staff collaboration, and staff morale. We could find no stable pattern of interaction effects. The large majority of interactions were statistically insignificant, and the ones that were significant did not follow any discernable pattern across the two subjects and the two years.

Discussion

If the data support any pattern, it is one suggested by a softer version of the bureaucratic centralization view: teacher control over curricular content is detrimental to achievement, but control over teaching methods may be beneficial. This pattern appeared in results for achievement during eighth grade mathematics and seventh grade science. It was not supported in analyses of seventh grade math and eighth grade science, and we have no explanation for the inconsistency. Participation in administrative decision-making also showed inconsistent results, with positive effects for eighth grade math, negative effects for seventh grade science, and no effects in the other cases. Teachers' reported influence over selected school policies yielded no effects in any case.

Despite the lack of a strong pattern, it is difficult to reconcile the findings with the loose coupling view. On the whole, empowerment does not seem irrelevant for student

achievement. The absence of a connection between school policies and achievement is expected by the loose coupling view, but the significant effects of the other three variables in two of the four analyses raise doubts about this perspective. One could interpret the finding that empowerment effects failed to operate by affecting instructional conditions as consistent with the loose coupling view, in that policies about the domain and extent of teacher control are apparently unrelated to teachers' instructional behavior, at least as it affects achievement. However, the weak effects of the instructional measures used in the study suggest that these may simply be poor measures of instruction, rather than instructional conditions that are detached from school policies. Better measures of instruction might reveal that effects of empowerment do operate by allowing teachers to modify their instructional practices, despite the results reported here.

The bureaucratic centralization perspective suggests that the benefits of centralization are greater when teaching and learning are well understood and characterized by clear and measurable goals. Notwithstanding recent reform efforts, research on subject-matter differences shows that math is taught in a more routine and predictable fashion than other subjects, including science (Stodolsky, 1988; Rowan, Raudenbush, and Cheong, 1993). Hence, the bureaucratic centralization view would predict stronger negative effects of empowerment in math compared with science. A contrary view might argue that where instruction is more routine, there is little predilection for change, so empowerment would have little impact. Our findings do not support either position about subject-matter differences, because we failed to find consistent differences between math and science.

Conclusions

The main contribution of this paper, we hope, is to point out some of the ambiguities that underlie current calls for teacher empowerment as part of educational reform packages. Empowerment is clearly no magic bullet, and neither theory nor past research gives reason for unequivocal support for the idea. The exploratory empirical analyses carried out in the paper offer scant evidence to adjudicate among conflicting views of empowerment. At most, they lean towards a view which says that the effects of empowerment depend on what aspect of teaching is empowered (e.g., methods versus content), and the domain in which empowerment occurs (e.g., school-level versus in the classroom).

Despite mixed support, neither theory nor evidence give any reason to abandon empowerment as an element of reform strategies. On the contrary, both provide some grounds for increasing teachers' roles in governing their schools and classes. Moreover, there are other outcomes besides student achievement for which teacher empowerment may be a useful lever (e.g., quality of school life for teachers). In enhancing teachers' control and influence, more specific attention must be given to the areas in which teachers are to be empowered, and to the goals that empowerment strategies are supposed to address.

NOTES

[1] Data on race and ethnicity were also available, but because many cases lacked information on these items, and because preliminary analyses showed no effects after prior achievement was controlled, we excluded the race and ethnicity items from our analyses.

[2] The selectivity indicator is calculated from a regression equation estimated on all students -- whether or not their teachers responded to the questionnaire -- using as the dependent variable whether or not their teachers responded. Since the dependent variable is dichotomous, the regression has a logistic form. Although the equation for the selectivity variable includes some of the same regressors as the main equations on student achievement, it is important for identification purposes that the regressors not be identical. In this case, the regressors in the selectivity equation were the region of the country in which the school was located, whether the school was located in an urban, suburban, or rural community, the average SES and math achievement level in the school, the percentage of minority students in the school, and the track level of the class. The selectivity equations showed a reasonable fit with the data, classifying around 70% of the cases correctly on the basis of the predictors. Four selectivity indicators were created, one for each year-subject in the main analyses.

[3] Although we present regressions that used student-level data, we also ran the regressions with data aggregated to the class level, and obtained the same results. Multilevel analyses of class and student level data are not feasible with LSAY because within-class sample sizes are small and inconsistent, with averages ranging from 6.9 sampled students per class in seventh-grade science to 4.8 in eighth-grade math.

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Appendix

EMPOWERMENT CONSTRUCTS:

Administrative Decision Making (alpha = .64)
- Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements.
  - Staff are involved in making decisions that affect us (BE19)
  - The principal seldom consults with staff members before he/she makes decisions that affect us (BE22, reverse-coded)

Influence over School Policy (alpha = .70)
- How much influence do teachers in your school have over policy in each of the areas below?
  - Determining student behavior codes (BE39)
  - Determining the content of inservice programs (BE40)
  - Setting policy on grouping students in classes by ability (BE41)
  - Establishing the school curriculum (BE42)

Control over Content (alpha = .67)
- How much control do you feel you have in your classroom over each of the following areas of your planning and teaching?
  - Selecting textbooks and other instructional materials (BE43)
  - Selecting content, topics, and skills to be taught (BE44)

Control over Method (alpha = .57)
- How much control do you feel you have in your classroom over each of the following areas of your planning and teaching?
  - Selecting teaching techniques (BE45)
  - Disciplining students (BE46)
  - Determining the amount of homework to be assigned (BE47)

Note: Responses are Likert scales scored 1-6 with 6 as high.

CONTINGENCIES:

Leadership (alpha = .89)

Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements.

The principal deals effectively with pressures from outside the school that might interfere with my teaching (BE17)

The principal sets priorities, makes plans, and sees that they are carried out (BE18)

The school administration's behavior toward the staff is supportive and encouraging (BE20)

Goals and priorities for the school are clear (BE23)

The principal lets staff know what is expected from them (BE27)

Staff Collaboration (alpha = .84)

Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements.

Teachers in this school are continually learning and seeking new ideas (BE21)

There is a great deal of cooperative effort among staff (BE24)

Staff members maintain high standards of performance (BE25)

The teachers in this school push the students pretty hard in their academic subjects (BE31)

Teacher Morale (alpha = .76)

Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements.

The learning environment in this school is not conducive to school achievement for most students (BE16, reverse-coded)

I usually look forward to each working day at this school (BE26)

I sometimes feel it is a waste of time to try to do my best as a teacher (BE28, reverse-coded)

Most students in this school work up to their ability (BE30)

In this school, there is really very little a teacher can do to insure that all of his/her students achieve at a high level (BE32, reverse-coded)

Note: Responses are Likert scales scored 1-6 with 6 as high.

Table 1. Means and Standard Deviations - mathematics

Variables	7th grade Mean	7th grade SD	8th grade Mean	8th grade SD
Dependent variables				
Fall 8th gr. math	52.77	11.05		
Fall 9th gr. math			56.60	11.85
Student background				
Fall 7th gr. math	50.48	9.82	51.25	9.93
Fall 7th gr. science	50.50	10.02	50.87	10.16
Fall 8th gr. math			53.38	10.61
Fall 8th gr. science			53.27	11.37
Sex (1=female)	.48	.50	.48	.50
SES	-.06	.72	-.01	.74
Class type				
High track	.32	.47	.24	.43
Low track	.13	.34	.19	.39
Untracked	.14	.35	.09	.28
Teacher background				
Teacher experience	12.76	7.79	12.10	7.44
Advanced degree	.54	.50	.42	.49
Math or math ed. major	.38	.49	.50	.50
Empowerment				
Control over content	3.87	1.33	4.07	1.44
Control over method	5.54	.70	5.68	.65
Influence school policy	3.52	1.14	3.38	1.26
Administrative dec-making	4.04	1.17	3.97	1.11
Instruction				
Time on new material	39.20	14.62	40.94	16.51
Discussion time	1.02	.78	.66	.52
Emphasis on prob. solving	3.52	.51	3.36	.67
	(N=1,786)		(N=1,041)	

Table 2. Means and Standard Deviations - science

Variables	7th grade Mean	7th grade SD	8th grade Mean	8th grade SD
Dependent variables				
Fall 8th gr. science	52.22	12.17		
Fall 9th gr. science			56.40	11.31
Student background				
Fall 7th gr. math	50.83	9.81	50.79	9.65
Fall 7th gr. science	50.49	10.22	51.01	9.95
Fall 8th gr. math			52.90	10.63
Fall 8th gr. science			53.09	11.77
Sex (1=female)	.48	.50	.48	.50
SES	-.07	.70	-.04	.72
Class type				
High track	.16	.37	.14	.34
Low track	.03	.17	.02	.14
Untracked	.53	.50	.55	.50
Teacher background				
Teacher experience	13.94	8.84	12.90	7.27
Advanced degree	.65	.48	.70	.46
Sic. or sci. ed. major	.38	.49	.48	.50
Empowerment				
Control over content	4.07	1.24	4.26	1.16
Control over method	5.40	.63	5.41	.72
Influence school policy	3.24	1.22	3.58	1.06
Administrative dec-making	3.86	1.37	3.72	1.29
Instruction				
Time on new material	38.18	15.80	41.79	12.92
Discussion time	1.17	.66	1.04	.69
Emphasis on prob. solving	3.12	.69	3.05	.66
	(N=1,547)		(N=906)	

Table 3. Metric coefficients for regression on achievement growth in mathematics during seventh grade

Independent Variables	Models (1)	(2)	(3)
Student background			
Fall 7th gr. math	.53**	.53**	.52**
	(.03)	(.03)	(.03)
Fall 7th gr. science	.23**	.23**	.22**
	(.02)	(.02)	(.02)
Sex (1=female)	1.05**	1.02**	1.01**
	(.36)	(.36)	(.36)
SES	.19	.20	.24
	(.27)	(.27)	(.27)
Class type			
High track	3.12**	3.03**	2.83**
	(.49)	(.49)	(.50)
Low track	-2.73**	-2.81**	-2.66**
	(.59)	(.59)	(.59)
Untracked	1.38*	1.39*	1.23*
	(.60)	(.60)	(.61)
Teacher background			
Teacher experience	-.06*	-.07**	-.06*
	(.02)	(.03)	(.03)
Advanced degree	1.28**	1.38**	1.10*
	(.40)	(.42)	(.44)
Math or math ed. major	-.17	.07	.05
	(.40)	(.41)	(.43)
Empowerment			
Control over content		-.04	-.03
		(.16)	(.16)
Control over method		-.29	-.30
		(.27)	(.27)
Influence school policy		-.42	-.30
		(.23)	(.27)
Administrative dec-making		.05	.01
		(.20)	(.20)
Instruction			
Time on new material			.03*
			(.01)
Discussion time			.00
			(.25)
Emphasis on problem solving			.02
			(.37)
Selection correction	-3.60**	-5.37**	-5.01**
	(1.33)	(1.51)	(1.53)
Constant	14.15	17.98	16.77
	(1.31)	(2.31)	(2.63)
Adjusted R^2	.55	.55	.55

* P > .05 ; ** P > .01

Note: Standard errors are in parentheses.

Table 4. Metric coefficients for regression on growth in mathematics achievement during eighth grade

Independent Variables	Models (1)	(2)	(3)
Student background			
Fall 7th gr. math	.38**	.38**	.37**
	(.04)	(.04)	(.04)
Fall 7th gr. science	.06	.06	.06
	(.03)	(.03)	(.03)
Fall 8th gr. math	.33**	.34**	.35**
	(.03)	(.03)	(.03)
Fall 8th gr. science	.16**	.16**	.16**
	(.03)	(.03)	(.03)
Sex (1=female)	.62	.62	.60
	(.45)	(.45)	(.45)
SES	.66	.49	.44
	(.33)	(.34)	(.34)
Class type			
High track	2.58**	2.55**	2.37**
	(.64)	(.64)	(.67)
Low track	-1.02	-1.07	-1.03
	(.63)	(.64)	(.65)
Untracked	.96	-.06	.30
	(.92)	(.97)	(1.00)
Teacher background			
Teacher experience	.01	.01	.00
	(.03)	(.03)	(.03)
Advanced degree	.59	.85	.88
	(.48)	(.50)	(.50)
Math or math ed. major	-.64	-.19	-.14
	(.48)	(.52)	(.56)
Empowerment			
Control over content		-.46*	-.37
		(.19)	(.20)
Control over method		1.44**	1.45**
		(.37)	(.38)
Influence school policy		-.23	-.26
		(.24)	(.25)
Administrative dec-making		.63*	.61*
		(.25)	(.26)
Instruction			
Time on new material			.00
			(.02)
Discussion time			.47
			(.49)
Emphasis on problem solving			.41
			(.39)
Selection correction	-.27	-.17	-.45
	(1.46)	(1.58)	(1.60)
Constant	7.19	-1.78	-3.69
	(1.73)	(2.99)	(3.35)
Adjusted R^2	.64	.65	.65

* P > .05 ; ** P > .01

Note: Standard errors are in parentheses.

Table 5. Metric coefficients for regression on growth in science achievement during seventh grade

	Models		
Independent Variables	(1)	(2)	(3)
Student background			
Fall 7th gr. math	.46**	.47**	.47**
	(.03)	(.03)	(.03)
Fall 7th gr. science	.46**	.46**	.46**
	(.03)	(.03)	(.03)
Sex (1=female)	.80	.80	.81
	(.44)	(.44)	(.44)
SES	.82*	.78*	.83*
	(.34)	(.34)	(.34)
Class type			
High track	-.64	-.53	-.18
	(.75)	(.75)	(.78)
Low track	-3.48**	-3.18*	-3.44**
	(1.31)	(1.32)	(1.33)
Untracked	.61	.71	.82
	(.55)	(.57)	(.58)
Teacher background			
Teacher experience	.01	-.01	-.01
	(.03)	(.03)	(.03)
Advanced degree	-1.42**	-1.69**	-1.38*
	(.52)	(.53)	(.59)
Math or math ed. major	.72	.94	.79
	(.51)	(.52)	(.52)
Empowerment			
Control over content		-.51*	-.56*
		(.24)	(.24)
Control over method		1.25**	1.09**
		(.38)	(.38)
Influence school policy		.53	.44
		(.27)	(.27)
Administrative dec-making		-.53*	-.46
		(.21)	(.21)
Instruction			
Time on new material			-.02
			(.02)
Discussion time			-.60
			(.34)
Emphasis on problem solving			-.84*
			(.38)
Selection correction	-6.76**	-5.94**	-6.42**
	(1.50)	(1.58)	(1.64)
Constant	7.39	2.94	8.17
	(1.51)	(2.49)	(3.03)
Adjusted R^2	.51	.52	.52

* P > .05 ; ** P > .01

Note: Standard errors are in parentheses.

Table 6. Metric coefficients for regression on growth in science achievement during eighth grade

Independent Variables	Models (1)	(2)	(3)
Student background			
Fall 7th gr. math	.11**	.11**	.12**
	(.04)	(.04)	(.04)
Fall 7th gr. science	.28**	.29**	.29**
	(.04)	(.04)	(.04)
Fall 8th gr. math	.21**	.21**	.20**
	(.04)	(.04)	(.04)
Fall 8th gr. science	.29**	.29**	.29**
	(.03)	(.03)	(.03)
Sex (1=female)	-.74	-.77	-.82
	(.50)	(.50)	(.50)
SES	.89*	.88*	.85*
	(.38)	(.38)	(.38)
Class type			
High track	.75	.87	.51
	(.86)	(.90)	(.99)
Low track	1.62	.84	1.16
	(1.79)	(1.82)	(1.87)
Untracked	.43	.98	1.43*
	(.61)	(.67)	(.70)
Teacher background			
Teacher experience	.01	.05	.05
	(.04)	(.04)	(.05)
Advanced degree	.09	.69	.98
	(.58)	(.70)	(.73)
Math or math ed. major	-.34	-.53	-.84
	(.54)	(.64)	(.66)
Empowerment			
Control over content		-.13	-.16
		(.27)	(.29)
Control over method		-.49	-.55
		(.47)	(.48)
Influence school policy		-.54	-.64
		(.36)	(.37)
Administrative dec-making		.46	.38
		(.28)	(.29)
Instruction			
Time on new material			.03
			(.02)
Discussion time			.77
			(.42)
Emphasis on problem solving			.37
			(.51)
Selection correction	-2.20	-2.64	-2.16
	(1.37)	(1.52)	(1.57)
Constant	10.38	12.64	9.87
	(1.87)	(3.05)	(3.52)
Adjusted R^2	.58	.58	.58

* P > .05 ; ** P > .01

Note: Standard errors are in parentheses.